

## CLARKIA EXILIS, A NEW CALIFORNIAN SPECIES

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Several new species of *Clarkia* have recently been described which have a very restricted distribution and which are morphologically very similar to well known and widely ranging species (Lewis and Lewis, Madroño 12: 33-39, 1953). These sympatric species pairs offer an unusual opportunity for the study of species differentiation. The new species described below forms another such pair with *C. unguiculata* Lindley (*C. elegans* Doug.). From herbarium studies, we had considered it to be a variant of *C. unguiculata*. However, when we observed the two taxa growing together in the Kern River Canyon, even a superficial examination indicated that the plants fell into two distinct groups with no intermediates. One of these was typical *C. unguiculata*, consisting of relatively coarse plants with conspicuously hairy buds that were not yet open. The other group consisted of slender, more delicate plants which were in flower. The flowers were similar to those usually found in *C. unguiculata*, although they were somewhat smaller and the petals were more slender. In addition, the buds of this group were not conspicuously hairy. Only two explanations were possible, namely, the two distinct groups were due to a simple genetic difference which was segregating into two classes with no intermediates, or the two groups represented distinct species. Present evidence indicates that the latter is the case.

*Clarkia exilis* sp. nov. Herba erecta altitudine ad 10 dm.; caulibus simplicibus vel ramosis, exilibus, glabris et glaucis; foliis superne lanceolatis, inferne angusto-ellipticis, 1-6 cm. longis, 2-14 mm. latis, denticulatis et glabris, sessilibus vel in basi ad petiolos usque ad 5 mm. longo angustatis; inflorescentium axe erecto; calycis tubo 1-3 mm. longo et annulo pilorum supra medium ornato; limbo 5-13 mm. longo, 1-2 mm. lato, sub anthesi connato et declinato; petalis unguiculatis, 5-15 mm. longis, 2-7 mm. latis; unguiculo gracili limbum aequante; limbo rhombiformi, roseo vel albo et in basi saepe roseo-purpureo maculato; staminibus 8, plerumque albis et similibus; stylo aequante stamines; stigmatibus quadrifido, lobis rotundatis; ovario 8-costato, 6-16 (-20) mm. longo; capsula gracili 15-30 mm. longa, 2-3 mm. lata; semina 1 mm. longa.

An erect annual herb, 2-6 (-10) dm. tall; stems slender, simple or branched, glabrous and glaucous; leaf blades lanceolate above, narrowly elliptical below, 1-6 cm. long, 2-14 mm. broad, more than four times as long as broad, glabrous or essentially so, sessile or with petioles as much as 5 mm. long; rachis of the inflorescence erect, buds at first erect, then deflexed, becoming erect again as the flowers open; sepals oblanceolate, 5-13 mm. long, 1-2 mm. broad, green, remaining united and deflexed to one side at anthesis, minutely and sometimes sparsely puberulent; hypanthium obconical to campanulate, 1-3 mm. long, the ring of hairs at or above the middle; petals 5-15 mm. long, 2-7 mm. broad, divergent, con-

spicuously clawed, the claw slender, equalling the limb, the limb rhomboid, lavender-pink or white, often with a dark reddish-purple spot at the base; stamens 8, in two similar series, white, or the outer series sometimes reddish; pollen white or cream-colored, occasionally purplish-gray; style about the same length as the stamens; stigma with four rounded lobes; ovary 8-ribbed, bright green, 6–16 (–20) mm. long, puberulent, sessile or on pedicels up to 3 mm. long; capsule slender, curved, 15–30 mm. long, 2–3 mm. broad; seeds about 1 mm. long, tuberculate, slightly if at all crested.

Type. Kern River Canyon, one mile from the mouth, Kern County, California, *Lewis, Lewis, and Vasek 908*, April 19, 1952 (UCLA).

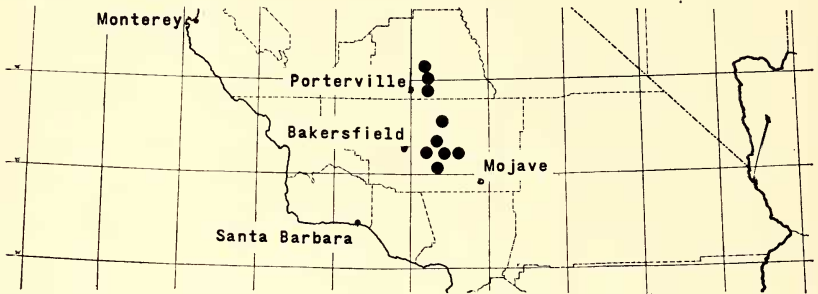


FIG. 1. Distribution of *Clarkia exilis* in Kern and Tulare counties, California.

Distribution. (See fig. 1.) Lower Kern River Canyon drainage, Kern County, north to lower Tule River drainage, Tulare County, California. Usually in shady or north-facing sites in the oak-digger pine woodland.

Specimens examined. Herbarium specimens have been examined at the following institutions: Pomona College, Rancho Santa Ana Botanical Garden, California Academy of Sciences, Stanford University, University of California at Berkeley and Los Angeles. We are grateful to the curators of these herbaria for the courtesies extended.

CALIFORNIA. Kern County: Kern River Canyon, *Abrams* in 1900; mouth of Kern Canyon, *Benson 3344, 3463, 3464*; lower Kern River Canyon, one mile from mouth, *Lewis, Lewis, and Vasek 908* (type); *Vasek 101, 121*; 2.3 miles from mouth, *Vasek 122*; 2.9 miles from mouth, *Vasek 123*; 3.8 miles from mouth, *Vasek 124*; 4 miles from mouth, *Abrams 11990, 12009*; 12 miles from mouth, *Keck and Stockwell 3264*; Rancheria Road, 9 miles from junction with Kern River Highway, *Vasek 125*; Breckenridge Mountain Road, 2 miles west of the junction with the road to the Kern River Highway, *Vasek 127*; 1.1 miles north of Granite Station on the road to Woody, *Vasek 130*. Tulare County: 3 miles east of White River, *Vasek 131*; Deer Creek Road, 11.4 miles west of California Hot Springs, *Vasek 132*; Tule Indian Reservation Road, 0.2 mile east of junction with Bartlett Park Road, *Vasek 133*.

The haploid chromosome number, 9, is based on examination of microspores of three plants from the type locality and two plants from Rancheria Road (*Vasek 125*). Permanent slides and herbarium vouchers are on file in the herbarium of the University of California, Los Angeles.

Relationship. *Clarkia exilis* is morphologically very similar to *C. unguiculata* and is undoubtedly most closely related to this species. The hybrid between them is difficult to produce in the garden, however, and the two species remain distinct in the field although they frequently occur in mixed colonies throughout the known range of *C. exilis*. Where the two species grow together our field observations indicate that they are easily distinguished on the basis of habit as well as the long spreading pubescence on the ovary and calyx of *C. unguiculata*. However, variants of *C. unguiculata* without conspicuous hairs on the ovary and calyx are found in other areas. No single character distinguishes all of the variants of *C. unguiculata* from *C. exilis*, but in general the relative length of the ovary and calyx at anthesis is definitive. The length of the ovary in *C. exilis* is about equal to the length of the sepals and hypanthium combined; the ovary of *C. unguiculata*, on the other hand, is conspicuously shorter than the combined length of the sepals and hypanthium.

A study, by Vasek, of the morphological and cytogenetical relationship of these two species is still in progress.

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## A CROSS BETWEEN AN ANNUAL SPECIES AND A PERENNIAL SPECIES OF CUCURBITA

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Except for *Cucurbita ficifolia* Bouché, a perennial, the species of cultivated *Cucurbita* are annuals (*C. pepo* L., *C. maxima* Duch., *C. mixta* Pang., and *C. moschata* Duch.). Repeated attempts to hybridize *C. ficifolia* with the four annual species have been failures, although occasionally small parthenocarpic fruits are set when pollen of *C. ficifolia* is used on female flowers of *C. pepo*. These results have been interpreted to mean that the sterility barriers between *C. ficifolia* and the four annual species are normally sufficient to prevent a flow of genes in either direction.

The perennial habit is of considerable interest in this group, appearing to be an adaptation to xerophytic conditions, and it becomes increasingly significant in relation to the northward spread of members of the group from tropical and subtropical Central America and southern Mexico to the deserts of northern Mexico and southwestern United States. In

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